

Anterior Coelomic Rhabdomyosarcoma in a Central American Banded Gecko, *Coleonyx mitratus*

Genevieve A. Dumonceaux¹, DVM, Anthony J. Smith², DVM,
Michael M. Garner³, DVM, DACVP

¹Busch Gardens, PO Box 9158, Tampa, FL 33674-9158

²Happy Hollow Zoo, 1300 Senter Rd., San Jose, CA 95112-2520

³Northwest ZooPath, 18210 Waverly Drive, Snohomish, WA 98296-7042

ABSTRACT: An adult female Central American banded gecko, *Coleonyx mitratus*, housed with a male of the same species for two years, became thin over an undetermined period of time. After separation from the male, regurgitation was noted. In spite of supportive care, the animal continued to lose weight over the subsequent ten days. Gastrointestinal contrast radiographs indicated a filling defect in the mid-intestinal region with generalized intestinal distention. Exploratory celiotomy revealed gas and fluid distention of all intestinal loops and a soft tissue mass in the cranial coelomic region. Histopathological examination of the soft tissue mass identified it as a rhabdomyosarcoma, a rare neoplasm in reptiles. Intestinal distention was attributed to ileus.

KEY WORDS: gecko, *Coleonyx mitratus*, neoplasia, rhabdomyosarcoma, ileus

INTRODUCTION

Rhabdomyosarcoma in mammals is a malignant tumor of striated muscle that most often originates in skeletal or cardiac muscle. It has a high metastatic potential in dogs and cats (Hammer and Couto, 1995). The morphologic features of rhabdomyosarcoma can be highly variable, with little or no evidence of muscle differentiation. Well differentiated tumors have neoplastic cells with features that resemble striated muscle cells. The formation of "strap cells" is a feature of well differentiated rhabdomyosarcoma. These cells are elongated with multiple nuclei and sarcoplasmic cross striations (Hulland, 1993). Phosphotungstic acid-hematoxylin (PTAH) stains the cross-striations of muscle cells blue, and is useful in detecting faint cross-striations in neoplastic cells of skeletal muscle origin (Luna, 1960).

Rhabdomyosarcomas have also been reported in birds involving the wing, shoulder or dorsal lumbar muscles (Raphael and Nguyen, 1980, Dorrenstein and Quesenberry, 1996), in a rhesus macaque (Blanchard and Watson, 1988), and a fallow deer (Kidd and Reuter, 1989). Recommended therapies for rhabdomyosarcoma in dogs include wide surgical excisions and chemotherapies. Long-term survival rate is low in most cases (Senior, *et al*, 1993; Stone, *et al*, 1996).

Neoplasms of every organ system have been reported in reptiles (Harshbarger, 1980, Frye, 1981, Done, 1996, Ramsay, *et al*, 1996). A variety of neoplasms have been reported in snakes, terrapins and lizards including rhabdomyomas, pheochromocytomas and lymphosarcomas. Reported cases of reptilian rhabdomyosarcoma are rare, with a few reports involving snakes (Lunger, *et al*, 1974, Elkan and Cooper,

1976, Machotka and Whitney, 1980, Done, 1996).

A report of rhabdomyosarcoma in two *Mastomys*, *Praomys coucha*, identified involvement of the rear limb muscles (Madarambe, *et al*, 1995). As in mammals, recommended treatment of malignant tumors in reptiles is wide surgical excision. Radiation and photodynamic therapy have been attempted in some cases with limited success (Ramsay, 1996). This report describes a rhabdomyosarcoma in a Central American banded gecko, *Coleonyx mitratus*. This is the first report of this type of neoplasm in a lizard.

CASE REPORT

An adult female Central American banded gecko of unknown age resided at the El Paso Zoo for two years prior to the onset of illness. This gecko was purchased from a private source. After a 30 day quarantine period, the female was housed with a male of the same species from the same source. Both animals were treated with 50 mg/kg fenbendazole suspension (Panacur 10%, Hoechst-Roussel, Somerville, NJ) PO once a week for four treatments for intestinal strongyles. No clinical problems had been reported in the female gecko prior to May, 1996, when keepers reported it to be thinner than normal. Information on food intake was unavailable as this animal was housed with the male. The ambient temperature of the enclosure averaged 29°C (85°F). On physical examination, the gecko was extremely thin and lethargic. Muscle atrophy was most evident over the rear legs and base of the tail. Body weight on initial examination was 10.0 g. Previous weights were unavailable.

Initial management included moving the two geckoes

into separate cages for closer monitoring of food intake and body weight. Three days later, the keepers reported that the female gecko had regurgitated after being fed immature crickets. The gecko was 9.5 g and poorly hydrated. Lactated Ringer's solution (LRS) was administered at 21 ml/kg along with gavage tube feeding of 0.1 ml of a meat based baby food diluted 1:1 with water to a total volume of 0.2 ml (21ml/kg). A very small pinch of a reptile vitamin/mineral supplement (Reptivite Reptile Vitamins, Zoo Med, Santa Ana, CA) was added to the feeding formula. This treatment was continued every 48 hours for ten days. When passing the tube for feeding, it would stop at the pectoral region. After gentle manipulation, the tube would advance into the stomach.

Four days after initiation of therapy a fecal specimen was collected and strongyle eggs were identified. Fenbendazole was administered in the next tube feeding at a dosage of 50 mg/kg at 29°C (85°F). The gecko ate crickets between gavage feedings and regurgitated within 24 hours of ingesting this food item. No regurgitation of the feeding formula was noted.

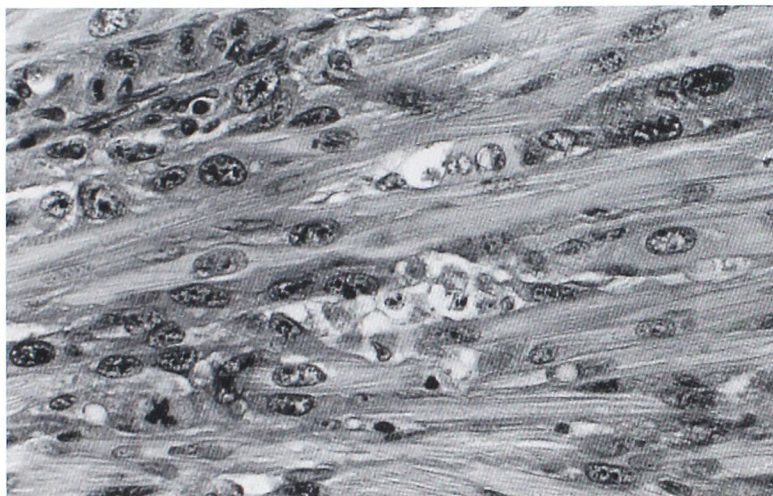


Figure 1A. Photomicrograph of rhabdomyosarcoma in a gecko. Streams of neoplastic elongated cells, are visible if viewed with partially polarized light. Note multinucleated cells, mitotic figures and prominent cross striations in neoplastic cells (H&E).

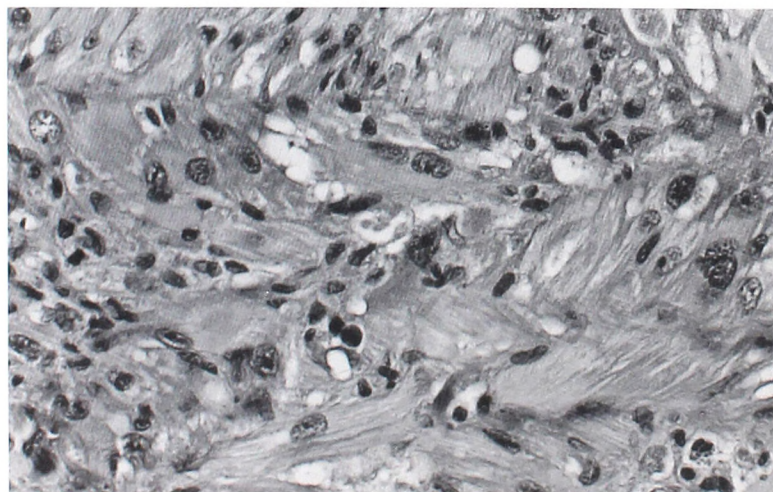


Figure 1B. Storiform pattern of less differentiated neoplastic cells that lack definitive cytoplasmic cross striational detail and which have more variability in nuclear size (PTAH).

Recommendations were made to discontinue the crickets and offer very young mealworms. The chitinous portions of the mealworms were regurgitated within 24 hours of ingestion.

The gecko continued to lose weight despite daily gavage feedings and continued fluid support with 21 ml/kg LRS q 24 hours. The body weight seven days after initiation of supportive care was 9.1 g. Lethargy increased and the animal became poorly responsive to handling. Radiographs were made the following day using high detail dental film (Kodak Ultra Speed Dental Film, size 4, Eastman Kodak Company, Rochester, NY). Due to the cachectic nature and small size of this animal, radiographic contrast was poor. No obvious lesions were identified. No gastric or intestinal gas patterns were evident.

The animal's condition continued to decline and, in spite of continued supportive care (tube feeding and fluid supplementation), no stools were produced. Body weight dropped to 9.0 g. A gastrointestinal radiographic contrast study was performed using 5.5 ml/kg diatrizoate meglumine (Gastrografin, Solvay Animal Health, Inc., Mendota Heights, MN) diluted with 5.5 ml/kg water. An equivalent amount (11 ml/kg) of meat baby food was mixed with the contrast material to increase viscosity. A defect was noted in the mid-intestinal tract. By 24 hours, the intestinal tract became filled with contrast material and was distended.

Based on the radiographic study and the rapid decline in the gecko's condition, an exploratory celiotomy was performed. Anesthesia was induced and maintained with isoflurane (Forane, Ohmeda Pharmaceuticals, Liberty Corner, NJ) in oxygen. A 2.0 cm incision was made from the caudal sternum to the pelvis. All sections of the intestinal tract were distended with fluid and gas. No evidence of an obstruction was found. Visual inspection of the cranial coelom revealed a mass associated with the pectoral region and cranial coelomic organs. The animal died during the surgical procedure.

Necropsy revealed a 1.0 cm x 0.5 cm x 0.5 cm heterogeneous soft tissue mass in the cranial coelomic cavity. The mass was firmly adhered to both sides of the inner surface of the coelomic wall close to the cervical coelomic inlet and was adhered to portions of the outer surface of the trachea and esophagus, causing mild compression of these structures. The mass partially circumscribed the cranial aspect of the pericardial sac.

Histologically, the tumor was generally comprised of interlacing streams and storiform patterns of neoplastic stellate or elongate spindle cells that had scant to moderate amounts of eosinophilic cytoplasm and variably distinct cytoplasm. In these areas, occasional elongated multinucleated "strap" cells were also detected. Many of the elongated cells contained cytoplasmic cross striations that were especially prominent in H&E stained sections viewed with retractile light, and the striations were blue in sections stained with phosphotungstic acid-hematoxylin (PTAH) techniques (Figures 1A and B). Focally, this pattern merged with a sheet of haphazardly arranged anaplastic round cells with no differentiating features. The tumor had large foci of cellular necrosis, and one necrotic region was colonized by small bacilli. These bacteria stained gram negative by Brown and Brenn technique and were not acid fast by Fite's technique

(Luna, 1960). The tumor was infiltrated by histologically normal skeletal muscle along some of the examined margins. The histologic and cytochemical staining features of the neoplasm were consistent with rhabdomyosarcoma (Hulland, 1993). Metastatic lesions were not detected in the set of tissues submitted for microscopic examination.

DISCUSSION

The rhabdomyosarcoma most likely originated in the skeletal muscle of the cranial coelomic inlet, based on its location and histologic association with skeletal muscle. Bacterial colonization of necrotic portions of the tumor was considered an embolic event associated with sepsis. It is unlikely that the bacteria were involved with tumor development.

Presumptive causes of neoplasia in reptiles include viruses and chemical exposures (Machotka, 1980, Ramsay, 1996). No virus-like inclusion bodies were seen on histopathological examination of the rhabdomyosarcoma in this case report. Virus isolation was not attempted.

The use of dental film allowed whole body radiographs to be made and a gastrointestinal contrast study to be performed to further explore the causes of this gecko's illness. Due to the small size and poor condition of this animal, sufficient soft tissue contrast was not available to detect the cranial coelomic mass, even with the use of high detail dental film.

In addition, there was likely summation of structures in this area. It is believed that an intestinal gas pocket caused a radiolucency that appeared as a filling defect in the lumen of the intestine in the contrast study. Gas distension of the intestines was suspected to be due to ileus. A filling defect was not detected in the esophageal area because the contrast material was placed directly into the stomach.

The gecko's tumor made it difficult for solid food items to pass through the esophagus. Regurgitation occurred because the esophagus could not expand to allow solid food to pass into the stomach. The tumor probably caused the difficulty experienced when passing the feeding tube. The inability of this animal to properly ingest the solid portions of its diet along with the presence of the neoplasm resulted in rapid weight loss to the point of cachexia.

REFERENCES

- Blanchard JL, Watson, EA. 1988. Spontaneous rhabdomyosarcoma in a rhesus monkey. *J Comp Path*, 99:109-113.
- Done LB. 1996. Neoplasia. In Mader DR (ed): *Reptile Medicine and Surgery*. WB Saunders Co, Philadelphia, PA:125-141.
- Dorrenstein GM, Quesenberry K. 1996. Disorders of the musculoskeletal system. In Altman RS, Clubb S, Dorrenstein G, Quesenberry K (eds): *Avian Medicine and Surgery*. WB Saunders Co, Philadelphia, PA:523-539.
- Elkan E, Cooper JE. 1976. Tumors and pseudotumors in some reptiles. *J Comp Path*, 86:337-349.
- Frye F. 1991. Lesions and disease processes. In Frye F (ed): *Captive Reptile Husbandry*. Krieger Pub Co, Malabar, FL:576-617.
- Frye FL. 1981. Pathology. In Frye FL (ed): *Biomedical and Surgical Aspects of Captive Reptile Husbandry*. Vet Med Pub Co, Edwardsville, KS:373-446.
- Hammer AS, Couto CG. 1995. Nonsurgical management of soft tissue sarcomas. In Bonagura JD, Kirk RW (eds): *Kirk's Current Vet Ther XII: S An Prac*, WB Saunders Co, Philadelphia, PA:502-506.
- Harshbarger JC. 1980. Neoplasms in zoo poikilotherms emphasizing cases in the registry of tumors in lower animals. In Montali RJ, Migaki G (eds): *Comp Path Zoo An*. Smithsonian Inst Press, Washington, DC:585-591.
- Hulland TJ. 1993. Pathology of domestic animals. In Jubb KVF, Kennedy PC, Palmer N (eds): 4th ed, Academic Press, Inc, San Diego, CA:261.
- Kidd GN, Reuter RE. 1989. Rhabdomyosarcoma in a fallow deer, *Dama dama*. *Vet Rec*, 124:466.
- Luna L. 1960. Manual of histologic and special staining techniques. 2nd ed. McGraw Hill Book Co, New York, NY:207.
- Lunger PD, Hardy WD, Clark HF. 1974. C-type virus particles in a reptilian tumor. *J Nat Cancer Inst*, 52:1231-1235.
- Machotka JV, Whitney GD. 1980. Neoplasms in snakes: report of a probable mesothelioma in a rattlesnake and a thorough tabulation of earlier cases. In Montali RJ, Migaki G (eds): *Comp Path Zoo An*, Smithsonian Inst Press, 593-602.
- Madarama H, Kashimoto Y, Kawamoto T, Toyonaga S, Hasegawa Y. 1995. Spontaneous rhabdomyosarcomas in aged Mastomys, *Praomys cocha*. *Lab An*, 29(4):464-469.
- Ramsay EC, Munson L, Lowenstine L, Fowler ME. 1996. A retrospective study of neoplasia in a collection of captive snakes. *J Zoo Wild Med*, 27(1):28-34.
- Raphael BL, Nguyen HT. 1980. Metastasizing rhabdomyosarcoma in a budgerigar. *JAVMA*, 177(9):925-926.
- Senior DF, Lawrence DT, Gunson C, Fox LE, Thompson JP, Buergelt CD. 1993. Successful treatment of botryoid rhabdomyosarcoma in the bladder of a dog. *AAHA*, 29:386-390.
- Stone EA, George TF, Gilson SD, Page RL. 1996. Partial cystectomy for urinary bladder neoplasia: surgical technique and outcome in 11 dogs. *J Sm An Prac*, 37:480-485.